

IN THE CLAIMS

Please amend the claims as shown in the following complete listing:

1. (Currently Amended) A linear motor (10) comprising a stator (411) and an actuator, the stator (411) being fed by a controlled voltage (V_M), the controlled voltage (V_M) being applied to the linear motor (10) and adjusted by a processing unit (22) by means of a variable frequency inverter,

the linear motor (10) moving a load from the actuator displacement, the linear motor (10) forming a resonant assembly with the load, the resonant assembly having a resonance frequency,

wherein the processing unit (22) of the linear motor (10) being characterized
~~in that the processing unit (22)~~ is configured to control a displacement range of the actuator by means of the controlled voltage (V_M),

the processing unit (22) selectively increasing or decreasing the displacement range of the actuator in a proportional manner to the variations of the resonance frequency throughout the load variations and to dynamically keep the resonant assembly in resonance.

2. (Currently Amended) A linear compressor (100) applicable to a cooling system (20), the linear compressor (100) comprising a piston (1) driven by a linear motor (10), the piston (10) having a displacement range controlled by a controlled electric voltage (V_M), the controlled electric voltage (V_M) having a voltage frequency (F_{VM}) applied to the linear motor (10) and adjusted by a processing unit (22),

wherein the processing unit (22) of the linear compressor (100) being
~~characterized in that the processing unit (22)~~ is configured to dynamically control the range of piston (1) displacement as a function of the variable demand of the cooling system (20), the linear compressor (100) having a resonance frequency,

and wherein the processing unit (22) adjusting the adjusts a range of piston displacement so that the linear compressor (100) will be dynamically kept in resonance throughout the variations in demand of the cooling system, the control of the pistons

displacement of the piston being made by means of the controlled voltage (V_M) that is adjusted by means of a variable frequency inverter, the inverter dynamically adjusting the voltage frequency (f_{VM}) of the controlled voltage (V_M) to a value equal to the value of the resonance frequency of the linear compressor (100), as the variations in demand of the cooling system (20) occur.

3. (Currently Amended) A linear compressor according to claim 2, ~~characterized in that~~ wherein:

the controlled voltage (V_M) generates a feed current (i_A) that circulates in the linear motor (10),

the processing unit (22) ~~measuring~~ measures a feed phase (ϕ_C) of the feed current (i_A) and the dynamic phase (ϕ_P) of the piston (1) of the linear compressor (100), and

the processing unit (22) ~~measuring the~~ measures a difference between the feed phase (ϕ_C) and the dynamic phase (ϕ_P) and ~~establishing~~ establishes a measured phase (ϕ_{PC}), the processing unit (22) adjusting the controlled voltage (V_M) so that the value of the measured phase (ϕ_{PC}) will be null.

4. (Currently Amended) A linear compressor according to claim 3, ~~characterized in that~~ wherein the controlled voltage (V_M) is decreased when the value of measured phase (ϕ_{PC}) is positive and increased ~~quant~~ when the measured phase (ϕ_{PC}) is negative.

5. (Currently Amended) A linear compressor according to claim 4, ~~characterized in that~~ wherein the feed phase (ϕ_C) is obtained from a pre-defined moment of the feed current (i_A).

6. (Currently Amended) A linear compressor according to claim 5, ~~characterized in that~~ wherein the pre-defined moment of the feed current (i_A) is the passage of the feed current (i_A) by zero.

7. (Currently Amended) A linear compressor according to claim 6, ~~characterized~~
~~on that wherein~~ the pre-defined moment is obtained at the middle point of the ~~permanence~~
duration of the feed current (i_A) at zero.

8. (Currently Amended) A linear compressor according to claim 7, ~~characterized~~
~~in that wherein~~ the dynamic phase (ϕ_P) is obtained from a signal of piston (1) displacement
(DP).

9. (Currently Amended) A linear compressor according to claim 8, ~~characterized~~
~~in that wherein~~ the value of the dynamic phase (ϕ_P) is obtained by means of a displacement
sensor (30) electrically associated to the processing unit (22).

10. (Currently Amended) A linear compressor according to claim 9, ~~characterized~~
~~in that wherein~~ the value of the dynamic phase (ϕ_P) is obtained from the position of piston
(1) displacement (DP).

11. – 17. (Canceled)

18. (Currently Amended) A cooling system (20) comprising a linear compressor
(100), the cooling system (20) comprising an on/off thermostat actuating the linear
compressor (100),

a the linear compressor (100) comprising a piston (1) driven by a linear motor
(10)

a the piston (1) having a displacement range controlled by means of a
controlled voltage (V_M), the controlled voltage (V_M) having a voltage frequency (f_{MV}) applied
to the linear motor (10) and adjusted by a processing unit (22),

~~the cooling system (20) being characterized in that wherein:~~

the range of piston (1) displacement is dynamically controlled ~~in junction~~ as a
function of a variable demand of the cooling system (20) during the period when the

thermostat turns on the linear compressor (100),

the linear compressor (100) ~~having~~ has a resonance frequency, the processing unit adjusting the range of piston (1) displacement so that the linear compressor (100) will be dynamically kept in resonance throughout the variations in demand of the cooling system (20), and wherein

the displacement ~~being~~ of the piston is adjusted through the controlled voltage (V_M) by means of a variable frequency inverter, the inverter dynamically adjusting the voltage frequency of the controlled voltage (V_M) to a value equal to the resonance frequency of the linear compressor (100), as the variations in demand of the cooling system (20) occur.

19. (Currently Amended) A linear compressor (100) controlling system, the system ~~being characterized by~~ comprising a processing unit (20) measuring a range of piston (1) displacement and the processing unit adjusting the range of the piston (1) displacement to dynamically keep the linear compressor (100) in resonance throughout the variations in demand of the cooling system (20), the ~~control central being configured~~ processing unit (20) adapted to measure a feed phase (ϕ_C) of a feed current (i_A) and a dynamic phase (ϕ_P) of the piston (1) of the linear compressor (100),

the processing unit (22) measuring the difference between the feed phase (ϕ_C) and the dynamic phase (ϕ_P) and establishing a measured phase (ϕ_{PC}), the processing unit (22) adjusting the controlled voltage (V_M) so that the value of the measured phase (ϕ_{PC}) will be ~~null~~ null;

the displacement of the piston being adjusted through the controlled voltage (V_M) by means of a variable frequency inverter, the inverter dynamically adjusting the voltage frequency of the controlled voltage (V_M) to a value equal to the resonance frequency of the linear compressor (100), as the variations in demand of the cooling system (20) occur.